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REPORT OF FINDINGS

GEOPHYSICAL SITE CHARACTERIZATION

Saad Trousdale Drive Site
Nashville, TN

September 30, 1991

INTRODUCTION

D. F. Stazy & Associates was contracted to conduct a ground conductivity survey at the Saad Trousdale Drive Site in Nashville, Tennessee. This work was conducted on September 30, 1991, as part of the Removal Action/Field Investigation at the referenced site. Information, i.e., electromagnetic data, obtained during the geophysical survey may be incorporated into the final report.

SCOPE OF WORK

The scope of work for this project was to characterize the subsurface through an analysis obtained from geophysical and geologic data, emphasizing the resistivity of the soils, a search for buried containers; and, to trace conductive plumes in terms of culturally placed structures, engineered structures or natural pathways.

The area of investigation was limited to the Saad Site property and was further restricted by the presence of equipment, vehicles, and other cultural interference. A primary objective of the geophysical survey was to locate areas of potential drum burial for future remedial/removal activities.

SITE DESCRIPTION

The study area is located in Nashville, TN within an industrial area which borders Trousdale Road towards the east and CSX's Radner Yards towards the west. Private property borders the site in the north/south directions.

The site occupies 0.4 acres and the topography is flat to gently sloping. The LTD Auto Body Shop is an active operation on the site and is situated in an on-site building.

During the geophysical survey several pieces of equipment and vehicles were present which precluded the collection of data in those areas. The vehicles and equipment either caused interferences with the instrument or made it impossible to physically survey those areas.

A waste water tanker vehicle was parked at the southern edge of the site along with various pieces of drilling equipment positioned nearby; and, a roll-off container was observed parked at the opposite end at the north-central edge of the site.

METHODOLOGY

Upon consideration of the scope of work, a decision was made to use a Geonics model EM-31D, ground conductivity meter, for a full

scan of the study site, including two modes of operation, a quadrature component scan and an in-phase component scan.

The in-phase scan is designed to produce an instantaneous instrument response to buried ferrous iron materials, whereas the quadrature component provides conductivity or resistivity data along the lateral plane of the study area.

A magnetometer will provide information regarding the presence of subsurface iron but it will not identify other materials which do not contain ferrous iron. This device also requires a closely spaced grid system and consequently an expanded time requirement.

Nearby metallic materials have an adverse effect on data collection; and, the instrument is very sensitive to solar activity which also hinders data collection. It did not appear to be a cost effective device within the scope of work requirements.

Conversely, an electromagnetic instrument will respond to any metallic and non metallic material since it reacts to changes in subsurface resistivity. It is also more cost effective requiring fewer instrument stations.

Data was collected from a grid network which was initiated in a north south X axis direction on 25 foot centers; and, an east west Y axis direction having instrument stations at 25 foot intervals. The starting point, X 0, Y 0, was located at the northwest corner of the grid approximately 25 feet from the north property line. Physical obstructions and influencing electromagnetic materials required an approximate 25 foot apron area of operation.

An additional traversing sequence was initiated at 12.5 foot spacing and intervals. (refer to plates 3 & 4)

INSTRUMENT PRESENTATION

Ground Conductivity

The Geonics, model EM-31, Ground Conductivity meter is a geophysical probing instrument consisting of a console and two protruding fiberglass tubes. One fiberglass boom contains a transmitting coil and the other contains a receiving coil. The total length of the assembled booms and console is 13 feet.

Ground conductivity probing is a means of determining electrical resistivity characteristics of the subsurface correlated to known conditions and associated anomalous changes. This is accomplished by an electromagnetic coupling between the instrument and the surface of the earth. Under certain conditions, as determined by the design of the instrument, the magnitude of the electromagnetic field produced by a transmitter

coil is directly proportional to the terrain conductivity, or resistivity, in the vicinity of that coil.

Though the ground conductivity meter is specifically designed for mapping groundwater contamination migration and other subsurface characterizations, the detectibility of large metal objects can be measured by utilizing the in-phase component of the induced magnetic field. Experiments at the Geonics facility have indicated that the instrument will detect a single 45 gallon drum to a distance of about 12 feet.

Subsurface scanning of the EM-31 instrument in the in-phase mode produces qualitative visual data that will allow spontaneous on site evaluations. This application is well suited for UST, buried drum and pipe line exploration.

DATA ANALYSIS AND INTERPRETATIONS

The survey field work entailed two modes of operation with the conductivity instrument, a quadrature scan and an in-phase scan.

These data were than contoured in ohm-meter units of resistivity, producing the computer generated contour maps (plates 1 & 3).

Conversely, data was not collected from the in-phase procedure but rather interpreted insitu at the time of the scan. Anomalous locations from the in-phase procedure were marked in the field and in the report maps.

Quadrature Component Analysis

It is a usual practice to establish a normal background scale of conductivity values near the study vicinity. This is done to determine the operable range scale of background values relative to any anomalous targets that are identified.

The background values for this project were established in an open field to the east of Trousdale Road. The 30 mhos/meter scale was the indicated off-site scale to use as the established background, although the on-site range indicated a higher scale range of 100 mhos/meter.

Two reasonable explanations are possible for this expanded scale change. First, a masking effect of a higher magnetic flux produced by both buried and surface metallic materials may have elevated the natural expected background range; and, second, the elevated resistivity may have been produced by a strata or target having a consistently higher value.

Metallic resistivity response was encountered during the quadrature component scan of the site. The following list of instrument stations indicated a linear (pipe-like) metallic response:

X-0,	Y-12.5	X-25,	Y-75
X-0,	Y-25	X-37.5,	Y-12.5
X-0,	Y-50	X-37.5,	Y-25
X-12.5,	Y-25	X-50,	Y-0
X-12.5,	Y-50	X-50,	Y-12.5
X-25,	Y-12.5	X-50,	Y-25
X-25,	Y-25	X-50,	Y-37.5
X-25,	Y-37.5	X-50,	Y-62.5
X-25,	Y-62.5	X-50,	Y-75
		X-75,	Y-25

Referring to plate 1, these locations are generally represented by the anomalous contours specified in the indicated instrument stations.

IN-PHASE ANALYSIS

In-phase response anomalies were marked in the field and are identified on the corresponding contour map of plate 1. Responses which displayed an axial linearity are also marked on plate 1 as an X, and those having a somewhat massive metallic response are marked as a circled X.

Although the source of the axial linear anomaly is unknown, it is conceivable that two buried drums laid horizontally end to end could respond as a seemingly linear conductor. Though the likelihood is improbable, it is a valid consideration.

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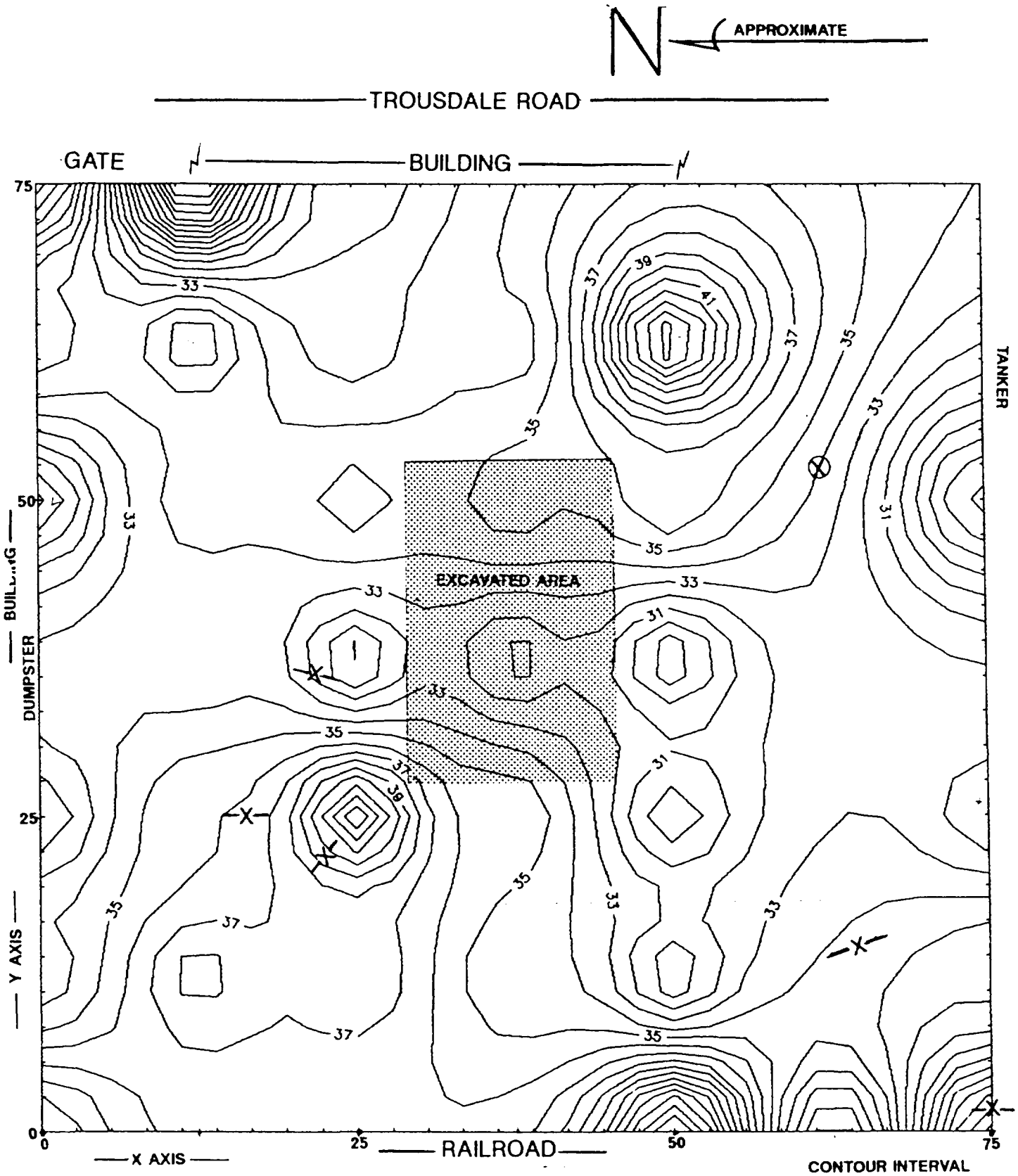
CONDUCTIVITY CONTOUR MAP



SAAD TROUSDALE DRIVE SITE

25 FOOT GRID

CONTOUR INTERVAL
1 OHM-METER
2.33 INCHES = 25 FEET

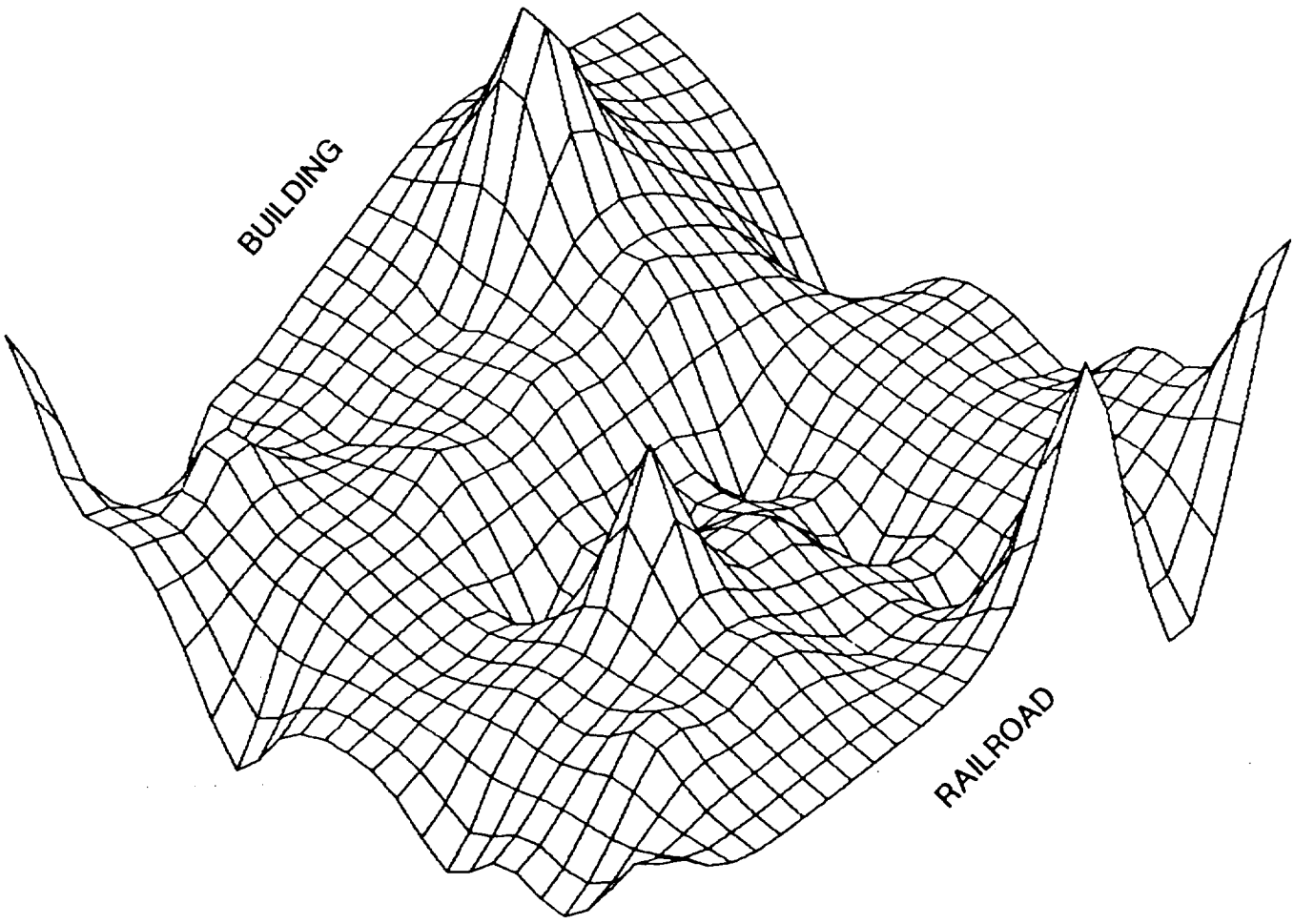
⊗ METALLIC ANOMALY

—X— LINEAR METALLIC ANOMALY

PLATE 1

THREE DIMENSION GRAPHIC

17 7 0501

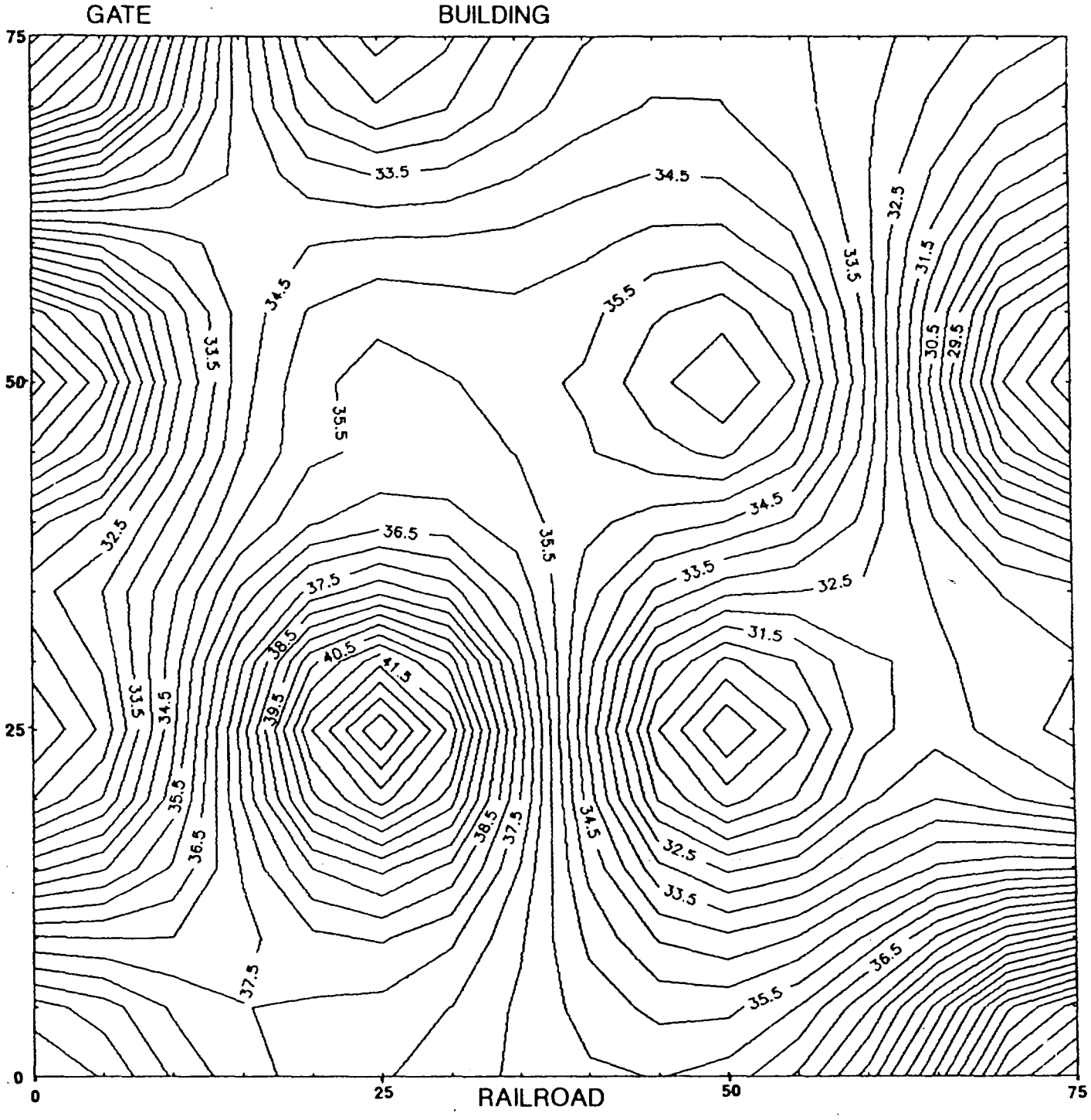


SAAD TROUSDALE DRIVE SITE

25 FOOT GRID

NOTE: THREE DIMENSION GRAPHIC
DERIVED FROM 25 FOOT GRID (PLATE 1)

COMPUTER CONTOUR MAP



SAAD TROUSDALE DRIVE SITE

12.5 FOOT GRID

2.33 INCHES = 25 FEET

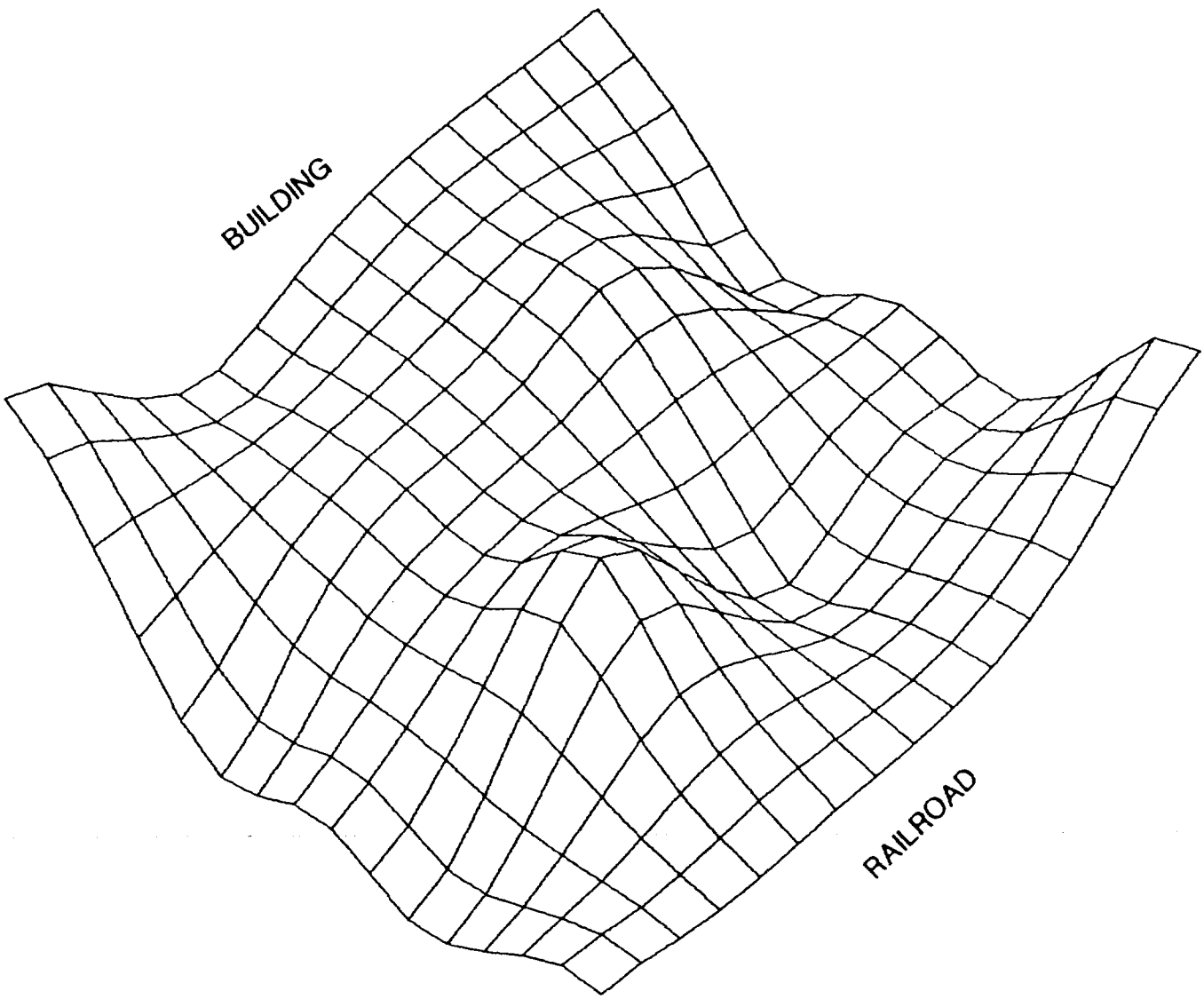
CONTOUR INTERVAL

.5 OHM-METERS

PLATE 3

THREE DIMENSION GRAPHIC

17 7 0303



SAAD TROUSDALE DRIVE SITE

12.5 FOOT GRID

NOTE: THREE DIMENSION GRAPHIC
DERIVED FROM 12.5 GRID (PLATE 3)

EXHIBIT 423

de maximis, inc.

9041 Executive Park Drive
Suite 601
Knoxville, TN 37923
(615) 691-5052

November 22, 1991

Saad Site Executive Committee
ATTN: Ms. Elizabeth Daniel
Bass, Berry & Sims
2700 First American Center
Nashville, TN 37238

Reference: Saad Trousdale Drive Site
Geophysical Survey Report

Dear Mr. Daniel:

Enclosed please find an original copy of the geophysical report from D.F. Stazy & Associates. The report summarizes electromagnetic survey work conducted at the referenced site on September 30, 1991. The report has been reviewed and revised based on comments from de maximis.

The geophysical report will be included in the Removal Action/Field Investigation Report as an appendix. If members of the committee have questions or comments related to the geophysical investigation please give me a call at (615) 691-5052.

The report is enclosed for your distribution and review.

Sincerely,

Robert L. Darwin

RLD/mdm

File:surrpt.ltr/dsk:11

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received

D. F. STAZY & ASSOCIATES
215 17th St. Wilmette, Illinois 60091
708/256-2738

Date: Nov 8, 1991

To: de maximis
9041 Executive Park Dr
Suite 601
Knoxville, TN 37923

Project Name: Saad Site

Project No.:

~~Gentlemen~~ Robert Darwin

We are sending you: [x] Enclosed [ ] Separately via [x] ~~Mail~~ [ ] Messenger

[ ] Drawings [ ] Prints [ ] Samples [ ] Literature/Letters [ ]

[ ] For Approval [ ] For Re-submission [ ] For Your Information [ ] For Construction [ ] Approved As Noted [ ]

Number	TYPE	DESCRIPTION
2	Reports	Saad Trousdale Road Site
		Revised

Remarks: Sorry for the delay. I was out of town for some time.

Revisions were taken from your notes.

Regards,
Don

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Yours very truly,
Donald F. Stazy

By